20. A flow meter, comprising:

an image sensor having a field of view, wherein the image sensor is positioned to view a drip chamber within the field of view;

a valve configured to control a flow of fluid through the drip chamber;

an actuator configured to actuate the valve to thereby control the flow of fluid through the drip chamber; and

at least one processor in communication with the image sensor to receive image data therefrom and with the actuator to actuate the valve, wherein the at least one processor compares an image of the image data to a reference image to estimate at least one parameter of liquid within the drip chamber and to thereby actuate the valve using the actuator in response to the at least one parameter of liquid to achieve a target flow rate.

21. The flow meter according to claim **20**, wherein the at least one processor determines an existence of a free flow condition using a distortion of a background pattern caused by the liquid as indicated by the image data.

22. The flow meter according to claim **21**, wherein the at least one processor determines the free flow condition exists when the liquid causes an array of lines of the background pattern to change angles by the distortion caused by the liquid when in the free flow condition as viewed within the field of view of the image sensor.

23. The flow meter according to claim **20**, wherein the at least one processor updates the reference image by multiplying each pixel of the reference image by a first constant and adding a corresponding pixel of the image multiplied by a second constant.

24. The flow meter according to claim **20**, wherein the at least one processor is further configured to identify a plurality of pixels of interest within the image.

25. The flow meter according to claim **24**, wherein the at least one processor is further configured to determine a subset of pixels within the plurality of pixels of interest.

26. The flow meter according to claim **25**, wherein each pixel of the plurality of pixels of interest is determined to be within the subset of pixels when there is a path to a baseline corresponding to the drip chamber.

27. The flow meter according to claim **26**, wherein the baseline is a predetermined set of pixels within the image sensor.

28. The flow meter according to claim **25**, wherein the at least one processor is further configured to perform a rotation operation on the subset of pixels.

29. The flow meter according to claim **28**, wherein the at least one processor is further configured to estimate a volume of a drop within the drip chamber by counting a number of pixels within the rotated subset of pixels.

30. The flow meter according to claim **24**, wherein the plurality of pixels of interest are identified by comparing the image to the reference image.

31. The flow meter according to claim **20**, wherein the at least one processor is further configured to initialize the reference image.

32. The flow meter according to claim **20**, wherein the at least one processor is further configured to update the reference image using the image captured by the image sensor.

33. The flow meter according to claim **32**, wherein the reference image is updated in accordance with: $P_{background,i,j}=P_{background,i,j}(1-\alpha_{background})+\alpha_{background}P_{input,i,j}$.

34. The flow meter as in claim **20**, wherein the at least one processor is further configured to update an array of variances using the image captured by the image sensor.

35. The flow meter according to claim **34**, wherein the array of variances is updated in accordance with:

$$\sigma_{temp}^{2}=(P_{background,i,j}-P_{input,i,j})^{2}$$

$$\sigma_{background,i,j}^{2}=\sigma_{background,i,j}^{2}(1-\beta_{background})+\beta_{background}\sigma_{temp}^{2}.$$

36. The flow meter according to claim **20**, wherein the at least one processor is further configured to update an array of integers in accordance with the image captured by the image sensor.

37. The flow meter according to claim **36**, wherein each integer of the array of integers corresponds to a number of updates of a pixel of the reference image.

38. The flow meter according to claim **37**, wherein the comparison of the image to the reference image only compares pixels within the image to pixels within the reference image if a respective integer of the array of integers indicates a respective pixel within the reference image has been updated at least a predetermined number of times.

39. The flow meter according to claim **20**, wherein the at least one processor is further configured to:

identify a drop in the image and a predetermined band near an edge of the drop; and

initialize the reference image by setting each pixel of the reference image to the image unless it is within the drop or the predetermined band near the edge of the drop.

40. The flow meter according to claim **39**, wherein the at least one processor is further configured to set a pixel of the reference image to a predetermined value if a corresponding pixel of the image is within the drop or the predetermined band near the edge of the drop.

41. The flow meter according to claim **40**, wherein the corresponding pixel of the image has a location corresponding to a location of the pixel of the reference image.

42. The flow meter according to claim **20**, wherein a baseline corresponds to an opening of the drip chamber.

43. The flow meter according to claim **42**, wherein the at least one processor is further configured to determine whether each of a plurality of pixels of interest is within a subset of pixels if a respective pixel of the plurality of pixels of interest has a contiguous path back to the baseline.

44. The flow meter according to claim **20**, further comprising a transceiver, wherein the at least one processor is configured to communicate with a monitoring client through the transceiver to communicate the flow of fluid through the drip chamber.

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